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## FRUIT JUICE BEVERAGE

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### [Claims]

#### [Claim 1]

Fruit juice beverage characterized in that it is a fruit juice beverage containing at least one of ascorbic acid and ascorbic acid salts, and kojic acid is added.

#### [Claim 2]

Fruit juice beverage of Claim 1 characterized in that the added quantity of kojic acid is 0.02 parts by weight per a total quantity of 1 part by weight of at least one of ascorbic acid and ascorbic acid salts.

[0001]

### [Detailed Explanation of the Invention]

The present invention concerns an excellent fruit juice which contains at least one of ascorbic acid and ascorbic acid salts and which does not brown over a long term.

[0002]

### [Prior Art Technology]

Conventionally, ascorbic acid and ascorbic acid salts (hereinafter referred to as ascorbic acids) frequently contained in vegetable and fruit juices and the like are called vitamin C because they are antiscorbutic factors, and are used as health-preserving drugs. Based on recent research, it is clear that the role fulfilled by ascorbic acid in the body is

not only to prevent and cure scurvy, but also to support the formation of collagen, to reinforce anti-fatigue action and an immunization function, to perform mutagenic deactivation, and many other areas, and its importance has been noted.

[0003]

Thus, in the background of the recent health boom, functional beverages (without fruit juice) containing ascorbic acids, fruit juice beverages with natural fruit juices containing ascorbic acids added in high concentrations, and the like have become widely available to consumers. Additionally, the development of health beverages intended to be fortified with vitamin C with the addition of ascorbic acid and ascorbic acid salts as a single item has progressed.

[0004]

[Problems the Invention is Meant to Resolve]

However, when the aforementioned ascorbic acids are added to a fruit juice beverage as a single item, the ascorbic acids contained in the juice itself combine with the aforementioned added portion, and the ascorbic acid concentration in the beverage becomes extremely high. When the ascorbic acid concentration becomes high in this manner, the ascorbic acid oxidizes over time and becomes dehydroascorbic acid. This reacts with the amino acids in the juice, becomes scorbanic acid, polymerizes, and becomes a brown substance. Therefore, the beverage easily takes on a brown color, and there is the defect that the outer appearance deteriorates. In particular, recently, with fruit juice beverages in transparent containers such as plastic bottles, glass bottles, and the like sold in large quantities by automatic vending machines, because the beverage inside can

be viewed from the outside, the deterioration of the outer appearance significantly decreases the product value, and can be said to be lethal.

[0005]

Thus, in order to inhibit the aforementioned chemical reaction with ascorbic acid and suppress the browning phenomenon, along with the addition of the ascorbic acids into the fruit juice, the addition of various antioxidants and quality-maintaining agents, e.g. ethylenediaminetetraacetic acid (EDTA), polyphosphoric acid, erythorbic acid, and the like has been proposed, but with the chemically synthetic products thereof, the allowable quantities that can be added are limited to low quantities, and within these limitations, anti-browning effects cannot be obtained to a great extent. Additionally, based on the use thereof, the taste of the base ingredients themselves of the beverage is occasionally lost. Also, adding these chemically synthetic products to a beverage is counter to the natural trend, and even though adding ascorbic acid has appeal as a fortification of vitamin C, it does not have a favorable image to customers.

[0006]

[Problems the Invention is Meant to Resolve]

In consideration of these circumstances, the objective of the present invention is to offer a fruit juice beverage which is a beverage containing ascorbic acid, browns little over time, and is stable with a rich taste.

[0007]

[Means for Resolving Problems]

In order to attain the aforementioned objective, the fruit juice beverage of the present invention is comprised in that it is a fruit juice beverage containing at least one of ascorbic acid and ascorbic acid salts, and kojic acid is added.

[0008]

More specifically, the present inventors have undergone much research concentrating on natural substances among various food additives, and the browning suppression effects thereof. As a result, even when orally ingested, when kojic acid,

which is safe and harmless, is used, it was discovered that the browning of a fruit beverage containing ascorbic acids can be effectively suppressed.

[0009]

The present invention is explained in detail below.

[0010]

First, the beverages targeted by the present invention are beverages containing the juice of fruits such as apples, mandarin oranges, lemons, yuzu, grapefruits, grapes, and the like. It makes no difference whether the juices are contained singly or in combinations of two or more in the beverage. With the present invention, at least one ascorbic acid is contained. It makes no difference whether the item is derived from natural fruit juice or is added and contained afterwards in the aforementioned fruit juice.

[0011]

The kojic acid used in the present invention was discovered as a by-product during the manufacture of rice malt, and may be fermented and formed by *Aspergillus oryzae*. The aforementioned kojic acid has abilities such as a chelate formation ability with metal ions, an oxidation prevention ability, whitening action, and the like. Because it is a natural substance, it is safe and harmless, and has a healthy image.

[0012]

The fruit juice beverage of the present invention is obtained by adding the aforementioned kojic acid to a fruit juice containing the aforementioned ascorbic acids, and the added quantity can be optionally set. It is suitable to set the added quantity of kojic acid at 0.02 parts by weight (hereinafter abbreviated to “parts”) per a total quantity of 1 part of the ascorbic acids. In particular, it is most preferable for it to be set at

between 0.02 – 2 parts. If there are less than 0.02 parts of kojic acid, the brown suppression effect of the fruit juice beverage easily become insufficient. For the addition method of the kojic acid, it may be added to a fruit juice beverage preparation in the same manner as normal food additives. When it is added, the kojic acid does not lose any of its attributes.

[0013]

With the fruit juice beverage obtained in this manner, regardless of the fact that it contains ascorbic acids, the ascorbic acids are chelated by the kojic acid and oxidation thereof is prevented. Thus, the chemical reaction described above does not occur, and there is no browning of the beverage over time. The fruit juice beverage does not lose its taste due to the aforementioned kojic acid; rather, the flavor of the beverage is deepened and increased, and is favorable.

[0014]

Embodiments are explained below along with a comparative example.

[0015]

[Embodiments 1 – 3, Comparative Example 1]

A cold beverage containing lemon juice, wherein ascorbic acid was added in the addition ratios shown in Table 1, was manufactured; kojic acid was added for the final product. Each product was sampled by 20 expert panelists, and the flavor was evaluated. After the products were stored for 2 weeks at 40°C, the degree of browning was visually evaluated. At this time, a product stored for 2 weeks at 50°C was used as a control product. The results are shown in Table 1 below.

	Embodiments	Comparative Example
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		1	2	3	1
Composition of fruit juice beverage (remainder is water) (parts)	Lemon fruit juice	30.0	30.0	30.0	30.0
	Sugar	12.0	12.0	12.0	12.0
	Ascorbic acid	0.9	0.9	0.9	0.9
Total ascorbic acid quantity (parts)		1.0	1.0	1.0	1.0
Kojic acid quantity (parts)		0.02	0.05	0.10	-
Evaluation	Taste of beverage	good	good	good	good
	Degree of browning based on sight*	±	-	-	+

\*: Evaluated below compared to the control product (the following tables are the same).

-: No browning was confirmed.

±: Slight browning was confirmed.

+: Browning was confirmed.

[0017]

From the aforementioned results, it can be seen that with the embodiments wherein 0.02 parts or more of were added to 1 part of the total ascorbic acids in the product, browning in each of the beverages was suppressed. Also, in each of the aforementioned embodiments, when 1.01 parts of sodium ascorbate were used in place of the ascorbic acids, results identical to the above were obtained.

[0018]

[Embodiments 4 – 6, Comparative Example 2]

A cold beverage containing apple juice, wherein ascorbic acid was added in the addition ratios shown in Table 2, was manufactured; kojic acid was added for the final

product. The taste and browning of each product was evaluated in the same manner as the aforementioned Embodiments 1 – 3. The results are shown in Table 2 below.

		Embodiments			Comparative Example
		1	2	3	1
Composition of fruit juice beverage (remainder is water) (parts)	Apple fruit juice	30.0	30.0	30.0	30.0
	Sugar	12.0	12.0	12.0	12.0
	Ascorbic acid	1.05	1.05	1.05	1.05
Total ascorbic acid quantity (parts)		1.12	1.12	1.12	1.12
Kojic acid quantity (parts)		0.03	0.08	0.15	-
Evaluation	Taste of beverage	good	good	good	good
	Degree of browning based on sight*	±	-	-	+

[0020]

From the aforementioned results, it can be seen that with the embodiments wherein 0.03 parts or more of were added to 1 part of the total ascorbic acids in the product, browning in each of the beverages was suppressed. Also, in each of the aforementioned embodiments, when 1.18 parts of sodium ascorbate were used in place of the ascorbic acids, results identical to the above were obtained.

[0021]

[Comparative Examples 3 – 5]

A beverage was manufactured with the same composition as the aforementioned Embodiment 4, and instead of kojic acid, EDTA was added in the ratios shown in Table 3 below. The taste and degree of browning are shown in Table 3 below.

[0022]

[Table 3]

		Comparative Examples		
		3	4	5
EDTA (parts)		0.02	0.10	0.20
Evaluation	Taste of beverage	normal	somewhat deteriorated	poor
	Degree of browning based on sight*	+	±	-

[0023]

From the aforementioned results, it can be seen that with EDTA, which is a conventional antioxidant, a large quantity must be added if browning suppression results are to be obtained, and when a large quantity is added, the taste deteriorates, so this is not preferable.

[0024]

#### [Results of the Invention]

As explained above, with the fruit juice beverage of the present invention, regardless of the beverage containing ascorbic acids, browning is not generated over a long term due to the presence of kojic acid. Moreover, even if a large quantity of the aforementioned kojic acid is added, not only is the original taste of the fruit juice beverage not lost, but the taste of the juice is provided with depth; thus, a juice with a taste superior to conventional juice can be obtained. Also, because kojic acid is a natural product generated from fermentation, consumers can be provided with a safer feeling compared to items wherein chemically synthetic products are added.

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